The Impact of Overconfidence Bias on Investment Decisions: Mediating Role of Risk Tolerance

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Abstract:

Purpose: **Investor's psychology plays an important role in decision making process and actually it is the motive behind this study. The research has been conducted to check the impact of overconfidence bias on investment decisions and how risk tolerance mediates their relationship.**

Design/Methodology/Approach: A survey questionnaire was adopted and validated through pilot data ($α = .911$). Convenience sampling was used to select the investors from Islamabad and Lahore stock exchanges. Overall 400 questionnaires were distributed, out of which 283 returns with 70% response rate. A simple regression analysis was done to predict the relationship between the concerned variables using SPSS 23.00.

Findings: The finding of the study indicates that overconfidence biashas a positive relation with investment decisions. Further it is also found that risk tolerance mediates their relationship.

Originality/Value: **The behavior of investor deviates from making logical or rational decisions and get influenced by overconfidence bias. This bias influences the investor's rationality in decision making.**

Limitations/Future Research Directions: Limited sample size, the use of less advanced analytical tool, less generalizability and overconfidence biasare certain limitations of current study. For future studies, it is suggested to conduct the longitudinal research along advanced analytical techniques to achieve more rigorous and robust findings.

Key Words: **Overconfidence Bias, Risk Tolerance, Investment Decisions, Financial Market of Pakistan**

I. INTRODUCTION

The aim of this study to add more literature to research conducted by Kumar & Goyal, (2015) and checks the impact of investor's overconfidence bias on investment decisions and how the risk tolerance mediates their relationship in Pakistan stock exchange. Investment decisions have influenced by overconfidence bias to this is the reason that overconfidence bias became an emerging topic of research now a day. The objective of this research is to extend literature and relationship between overconfidence bias and investment decision with adding risk tolerance as a mediator. The study has managerial implications for Pakistan stock exchanges.

Behavioral finance studies the psychological aspect of financial decision-making and explains the irrationality of investors in investment decision-making. Usually, the investor's behavior deviates from making rational or logical decisions and leans towards being influenced by various overconfidence biases. These biases influence the investor's rationality in investment decision-making. Kahneman & Tversky (1979) developed prospect theory and explained that the investor's decision-making is based on potential gains and losses rather than on final outcomes. This phenomenon occurs because of the behavior biases that affect the judgment of these gains and losses. Investors how various types of overconfidence bias, and we have reviewed three biases in the following sections.

Due to bounded rationality, human beings are known to make decisions based on their intuitions and feeling rather than collecting sufficient information which will facilitate effective decision making. Studies conducted have shown that investors make irrational investment decisions (Phung & Le, 2013). According to Markowitz (1952) investors are rational and risk averse and will prefer low risk to high risk for a given level of return. However, in the real market, investors perform irrational behaviors; because they trade more transactions, purchasing of stock without measuring the fundamental value, investors decisions have based on their decisions on past performance, buy the stocks their friends are buying, and retain losing stocks while selling winning stocks(Kahneman & Tversky, 1979).

The current study focuses on Behavioral finance; it means that I have examined the individual investor behavior. The study assumed that investors of specific overconfidence bias can prey to behavioral bias such as overconfidence bias with the mediating role of risk tolerance. Irrationality in decision making is due to overconfidence bias. Shefrin (2007) defines bias is a susceptibility/tendency towards error. The study discussed the mediating effect of risk tolerance between the investor's overconfidence bias and behavioral bias i.e. overconfidence bias. In this research, investor's overconfidence bias is classified under Big five model which includes the following traits i.e. openness, conscientiousness, extroversion, agreeableness, and neuroticism.

II. LITERATURES REVIEW

2.1. Investment Decisions

Investment decisions in regular life rely on combination of different factors like habit, emotion, reasonand social interaction. Research in behavioral finance shed serious doubts on validity of traditional finance theories like efficient markets, portfolio theory and risk-return trade-off. Franco Modigliani and Merton Miller work in finance and their assumption of rational man who maximize utility is no more relevant due to lack of empirical evidences (De Bondt, Mayoral, & Vallelado, 2013). Standard finance models are based on rationality which implies two things i.e. investorsapprise their belief in current scenario and make decisions reliable with subjective expected utility theory. The efficient capital markets concept proposed that non-rational investor distort prices while due to arbitrage opportunities, expert traders take full advantage. However, human intuition and overconfidence bias play key role in financial decisions (De Bondt, et al., 2013).

Investors with different profile invest differently and behave in different manner. Pompian & Longo (2004) asserted that client profiling should take into account the fact that different investor has different behavior. They suggested that every investment policy statement should be based on investor profile and this is an effective way to manage individual overconfidence bias. Pompian (2008) divided investor into two main types' passive and active investors. Passive investors have money through inherited property while active investors are collecting wealth by taking risks on their own capital and they are more confident. Kudryavtsev, Cohen, & Hon-Snir (2013) reported that active investors show more overconfidence bias than passive investors. Therefore, concept of investor's type should also include in studying investment decision- making. Harikanth & Pragathi (2012) claimed that investor's type has impact on investment decision by investor. Yates, Lee, & Bush (1997) claimed that psychologists and social scientists are admitting impact of behavior biases in investment decision and different investors behave differently. Yates, et al., (1997) revealed an important fact that Asian investors show more overconfidence bias as compared to Western investors.

There are many considerations regarding the investor's preference about stocks, as mostly investors prefer to purchase most desirable stocks. Investor's selling decisions mostly depend upon winning stocks. On the other hand, buying decisions linked with both losing and winning stocks. There are thousands of listed securities and investors usually purchase those stocks in which they have interest and awareness regarding the stocks past performance either bad or either good (Barber & Odean, 1999). Similarly, selling decisions are easy for individual investors because during the selling decisions they only concentrated on their holding stocks while on the other side buying decisions are quite tricky as they have lots of factors regarding the stocks purchase (Barberis & Thaler, 2003).

2.2. Overconfidence Bias

Globalization emergence and existence of competitive, complex, unpredictable and volatile business environment has completely transformed financial world (Shepherd, Williams, & Patzelt, 2015). In accordance to Benjamin, Brown, & Shapiro (2013) behavioral financial is deliberated as field of finance and behavioral financial is based on psychological theory that assumes that information structure as well as characteristics of participants of market are highly influence the decisions of investors and market outcomes. Behavioral bias weakens decision making power of the investors as the emphasis is only laid on the neglecting the significance of the logical aspects. In accordance to Barberis & Thaler (2003) highlighted and examined that behavioral finance assists the investor to take good decision in context to investment with very less influence of behavioral bias.

Overconfidence is a behavioral phenomenon, in the financial market there are many ways an investor expresses it. Overconfidence is a behavioral bias that is characterized by an individual investors own belief. In easy words over estimation or over forecasting of investment return is overconfidence bias. Barber & Odean (2001) argued that the more trading is the cause of overconfidence because when an investor did more transactions then his experience and confidence increase on every transaction, so this course of action became an overconfidence bias because his forecasting is higher than actually warranted.Overconfidence bias impacts on the decision making, in corporate as well as individual investments. The research works by Miller, Spengler, & Spengler (2015) explain overconfidence "pertains to how well people understand their own abilities and the limits of their knowledge."

Generally, it has been analyzed that most people tend to overall overestimate their abilities and skills in performing the task well. This result and causes to take number of impulsive decisions by the investor who consider themselves better than others and think that they have more knowledge in comparison to others, which many times leads to number of problems. This is mainly because when an investor is overconfident, he neglects number of important elements and also avoids taking suggestions from the experienced people which might be really beneficial for him. Previous research regarding overconfidence bias analyzed those overconfident investors more invest in stocks and hold risky stock because he believes that his information and judgment of market is accurate. Overconfidence bias changes the investor behavior while making investment decision. Investor overestimates their skills, knowledge and undervalues the risk and overestimates their ability to control events (Prosad, Kapoor, & Sengupta, 2012). After synthesis of previous literatures, following hypothesis is proposed.

H1: *Overconfidence Bias has a significant impact on investment decisions.*

2.3. The Mediating Role of Risk Tolerance

Risk tolerance is an important topic in financial management. The knowledge about risk tolerance has grown day by day, this is the reason the developed countries focus on risk tolerance and conduct research on it in United States and in Australia (Malmendier & Tate, 2005). However, there is absence of research on risk tolerance and on individual investors behavior in emerging countries particularly in Asian Countries such as Japan, China, Malaysia, Korea and as well as Pakistan. Therefore, this study is helpful to fill the gap in literature of risk tolerance as a mediator variable. On the other side, the measurement of risk tolerance of investors is interesting and emerging field of behavioral finance. Every individual investordecisionis derived by utility function, so risk tolerance is a factor that tend an investor to take decision with the consideration of risk.Some investors are comfortable in risky situation and they are taking risk accordance of gain opportunities. Risk tolerance shows the ability of bearing loss and willingness to take risk. If investor is aggressive than his level of risk is also high because of aggressive behavior. Aggressive behavior leads an investor to take risk and tolerate the probability of loss and only focus on probability of gain or success (Kudryavtsev, et al., 2013).The investor with high level of risk investors taking risky investment decision and his return is also high and if investor is not comfortable with risk than he makes less risky investment decision and happy in low gain. It means, it depends on famous principle of "more risk, more return".Risk tolerance is shapes investors investment and financial decision. Thus, risk tolerance behavior is important in investment decision making.

H2: *Overconfidence Bias has a significant impact on Risk Tolerance.*

H3: *Risk Tolerance has a significant impact on investment decisions.*

H4: *Risk Tolerance does mediate the relationship between Overconfidence Bias and investment decisions.*

2.4. Scope of Study in Pakistan

The researcher Malik & Elahi (2014) conducted study on Karachi stock exchange and manipulates that overconfidence bias influence positively on investment decision. The researchers also explore the future research gap in the financial market of Pakistan and gives direction to do research Pakistan stock exchange. Irshad & Sarwar (2013) conducted a research on Pakistan and Kuwait stock market and results of this study shows that Pakistan and Kuwait stock exchange are inefficient and week form of financial market. Because of inefficient market the information is not accurate and easily available in open market so that's why investor's investment decisions are more influenced by overconfidence bias. Pakistan stock exchange is inefficient or week form of financial market. The research work of Irshad & Sarwar (2013)says that when market sentiments shows the real face of market and information available on official platform it means there are no insider information is available than investors are enabling to analyze and interpret the actual value of stock and then make rational decision on the bases of that.

III. RESEARCH FRAMEWORK

After a deep analysis of past literatures and regarding the research gap identified by current study, the conceptual framework proposed for current study looks like that:
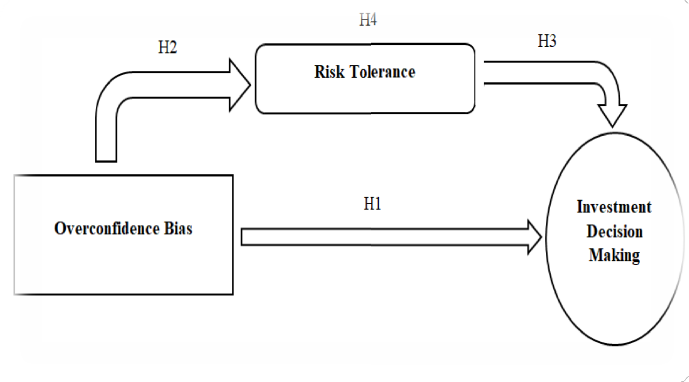

Fig. 01: Conceptual Framework

IV. RESEARCH METHODOLOGY

For this study, primary data was collected through survey questionnaire. The questionnaire was adopted from different research papers developed by different authors in different time span. The questionnaire contained different statements asked from concerned population. All the respondents were requested to answer 19 different questions, measuring the concerned variables. All the information was collected by physically visiting the Lahore and Islamabad stock exchanges from those investors who were available conveniently. The survey questionnaire contained 19 close-ended questions, used to measure the concerned variables. The aggregate Cronbach's alpha value is .911 and expressed the internal consistency of data. On the other hand, the item wised Cronbach's alpha values are also at acceptable level and proves the internal consistency of all the concerned variables.After gathering all the required information, the subsequent stage comes to evaluate the data to arrive at a solution, and to answer the research questions. For the evaluation of results, the questionnaire was distributed to 400 respondents out of which 283were return back with overall response rate of 70%.The analysis was done into three principle phases: data screening, simple and multiple regression analysis and mediation analysis by using SPSS 23.0. Initially in data screening phase, the facts and figures were tested for violating statistical suppositions.Hypotheses were tested using regression analysis so as to know the impact of overconfidence bias on investment decisions. Multiple regression analysis was also used to examine the collective impact of IV's on DV. Lastly, mediation analysis was used in

order to know how or why a particular effect or relationship occurs.

V. RESULTS AND DISCUSSION

5.1. Demographic Description

The gender demographics represents that 84.8% sample was consists of male respondents and only 15.2% were female participants. The result shows that in Pakistan there are more male investors as compared to female investors. The age demographics in the form of frequency tables shows that 7% respondents were of age less than 21 years, 29% belongs to age group of 21-30 years, 57.6% respondents were of age group 31-40 years, and 12.7% were in between 41-50 years of age group. In short, the maximum numbers of investors were from 31-40 years of age group who are investing in stock exchange.It has been shown in table 5.4 that Pakistani stock exchanges have educated investors which is good for Pakistani business industry. Approximately 30% investors are graduated while 53% are those who are masters. On the other hand, only 17% are belonging to M.Phil. The demographic variable of education has a mean value of 1.88 and standard deviation of 0.677, while the maximum and the minimum values are 1 and 3 respectively.

5.2. Regression Analysis of Overconfidence Bias and Investment Decisions

	Model	Sum of Squares	Df	Mean Square	F	Sig.
		ANOVA Result				
1	Regression	69.241	1	69.241	158.578	.000[b]
	Residual	122.695	281	.437		
	Total	191.936	282			
a. Dependent Variable: Investment Decisions						
b. Predictors: (Constant), Over-confidence Bias						

	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		Regression Coefficient				
		B	Std. Error	Beta		
1	(Constant)	1.665	.174		9.545	.000
	OC	.618	.049	.601	12.593	.000
a. Dependent Variable: Investment Decisions						

Over-confidence bias is the dimension of overconfidence bias as over-confidence having a positive impact on investment decisions. The reason behind this positive relationship is that sometimes the investors get benefitted from their overconfidence while investing in stocks. As

per model summary the adjusted R Square is .358 meaning that 35.8% variations are occurring in investment decisions due to over-confidence bias. Therefore, H2 is accepted. The coefficient table specify that overconfidence bias under the unstandardized coefficient is 0.618 gives the value that if overconfidence bias is zero then investment decisions will increase by 1. 665.On the other hand if overconfidence bias goes up by 1, then investment decisions are projected to go up by 0.618: hence indicating a significant relationship.

5.3. Regression Analysis of Risk Tolerance and Investment Decisions

	Model	Sum of Squares	Df	Mean Square	F	Sig.
		Model Summary				
		Table 5.31: ANOVA Result				
1	Regression	105.887	1	105.887	345.785	.000[b]
	Residual	86.049	281	.306		
	Total	191.936	282			
a. Dependent Variable: Investment Decisions						
b. Predictors: (Constant), Risk Tolerance						

Regression Coefficient						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.143	.147		7.784	.000
	RT	.731	.039	.743	18.595	.000
a. Dependent Variable: Investment Decision						

Risk tolerance is the mediating variable in this research model, but in this situation, it is acting as the independent variable. According to model summary adjusted R Square is 0.550 meaning that approximately 55% variations are occurring in investment decisions due to change in risk tolerance. Similarly, from ANOVA table, the result is substantial as P value is less than 0.05, so H6 is also accepted.

The coefficient table representing that unstandardized coefficient of risk tolerance is 0.731, meaning that if risk tolerance is zero then the investment decisions will increase by 1.143. Conversely, if the value of risk tolerance increases by 1, then investment decisions will increase by 0.731: thus, presenting a considerable relationship.

5.4. Regression Analysis of Risk Tolerance as a Mediator between Overconfidence bias and Investment Decisions

ANOVA Result						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	76.998	3	25.666	62.301	.000[b]
	Residual	114.938	279	.412		
	Total	191.936	282			
2	Regression	108.704	4	27.176	90.770	.000[c]
	Residual	83.232	278	.299		
	Total	191.936	282			
a. Dependent Variable: ID						
b. Predictors: (Constant), OCB						
c. Predictors: (Constant), OCB						

Regression Coefficient						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.137	.209		5.448	.000
	OC	.448	.065	.435	6.843	.000
2	(Constant)	.881	.180		4.904	.000
	OC	.147	.063	.143	2.344	.020
a. Dependent Variable: Investment Decisions						

In current situation, Risk Tolerance is playing the mediating role between Overconfidence bias and Investment Decision. The current mediation is explained through "Four Paths Theory". This theory says that there is mediation when all four paths are significant, and p-value lies under the acceptable range. In given summary model, the value of adjusted R-square without mediator is .401 which shows that 40% variation is occurring in Investment Decision because of overconfidence bias. After the addition of Risk Tolerance as mediating variable, the value of adjusted R-Square is .566. It shows that after the addition of mediating the variable, the value of adjusted R-square has been changed. However, the relationship between Overconfidence bias and Investment Decisions becomes insignificant after the addition of mediating variable. According to Four Paths Theory, mediation proved when all the paths are significant. In given case, one path becomes insignificant. Hence, mediation is proved and H4 is accepted.

VI. CONCLUSION & RECOMMENDATIONS

The current dissertation report investigates the impact of overconfidence bias on investment decisions with the mediating role of Risk Tolerance. The data has been collected from financial markets of Pakistan including Pakistan Stock Exchange Islamabad and Lahore Stock Exchange Pakistan. SPSS (Version 23.00) has been used for data analysis. Total seven hypotheses are assumed after the analysis of previous literature and dimension of selected variables. The significant relationships have been found among all the variables and all hypotheses are accepted.

H1 hypothesis explains the individual relationship between Overconfidence Biases and Investment Decisions. The hypothesis assumes that Overconfidence Bias significantly impacts the Investment Decision. After data analysis, the results support the assumed hypothesis that overconfidence significantly impacts the investment decision as p-value for current relation is -000 which is under the acceptable range. The p-value shows that overconfidence bias highly significantly impacts the investment decision. The findings are very consistent to the previous studies. H2 explains the relationship between investor's behavioral traits and Risk tolerance. The hypothesis proposes that investor's behavioral traits significantly impact the risk tolerance. After the data analysis, a significant relationship has been found between both variables as the p-value is .000 that lies under the acceptable range. In the same line, H3 proposed that Risk Tolerance significantly impacts the Investment Decisions. Both of hypotheses are accepted as the p-values for both hypotheses are 0.000 and they lie under the acceptable range. Hence, both hypotheses are accepted, and Risk Tolerance has significant relationships with selected Overconfidence bias and Investment Decisions.

H4 hypothesis measures the mediating role of Risk Tolerance between overconfidence bias and Investment Decision. The Four Path Theory has been used to measure the mediating impact of risk tolerance. The results analysis shows that Risk tolerance mediate the relationship between Overconfidence bias and Risk Tolerance. Hence, H4 is accepted.The findings of current study suggest that investors with overconfidence bias are most luckily to take wrong decisions. Although their risk tolerance capability is high, however they are overconfident to make the investment decisions and may result in loss.

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